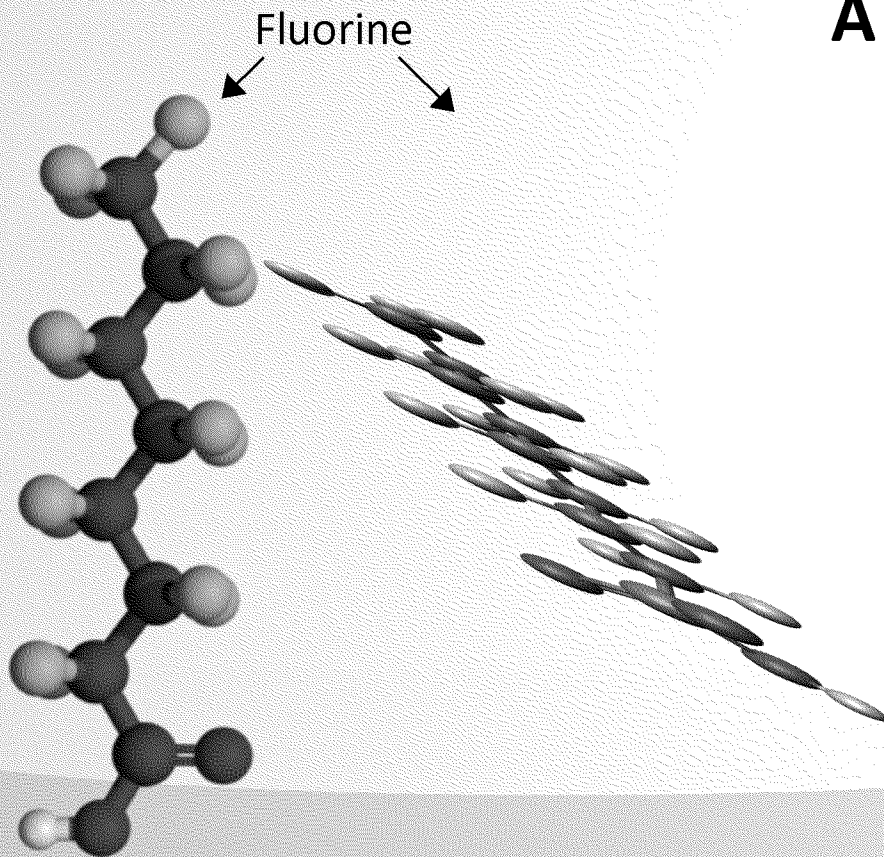




US EPA PFAS Research and Development

Community Engagement in Fayetteville, North Carolina

August 14, 2018

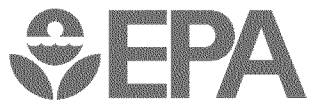


PFOA

PFOS

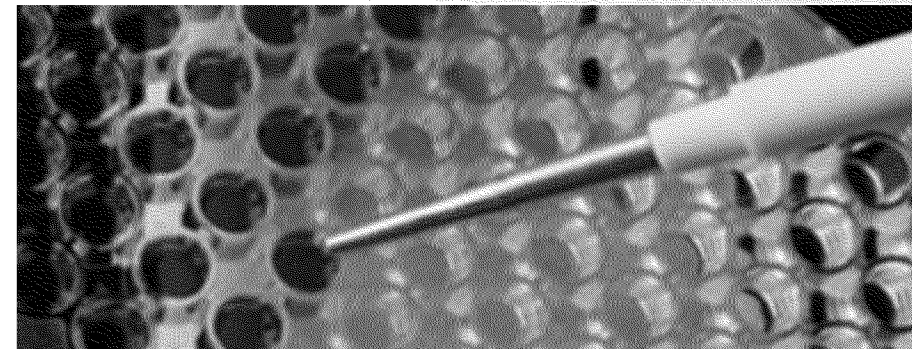
A class of man-made chemicals

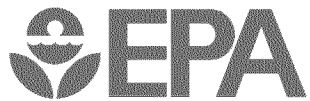
- **Chains** of carbon (C) atoms surrounded by fluorine (F) atoms, with different endings
- **Complicated chemistry** – thousands of different variations exist in commerce
- **Widely used** in industrial processes and in consumer products
- **Some** PFAS are known to be **PBT**:
 - **Persistent** in the environment
 - **Bioaccumulative** in organisms
 - **Toxic** at relatively low (ppt) levels



Current Per- and Polyfluoroalkyl Substances (PFAS) Research and Development Activities

- **Analytical Methods**
- **Exposure**
- **Human Health/Toxicity**
- **Treatment/Remediation**
- **Technical Assistance**





Research: Analytical Methods

- **Problem:** Lack of standardized/validated analytical methods for measuring PFAS
- **Action:** Develop and validate analytical methods for detecting, quantifying PFAS in water, air, and solids
- **Results:**
 - Testing current drinking water method for 6 additional PFAS (20 total, including GenX)
 - Developing and testing method for 24 PFAS in surface water, ground water, and solids
 - Initial development of method for air emission sampling and analysis
 - Continued development of non-targeted methods to discover unknown PFAS
- **Impact:** Stakeholders will have reliable analytical methods to test for known and new PFAS in water, solids, and air



Research: Exposure

- **Problem:** Lack of knowledge on sources, site-specific concentrations, and exposure
- **Action:** Develop and test methods to characterize PFAS sources and exposures
- **Results:**
 - Developing exposure models for identifying, quantifying PFAS exposure pathways and relative source contribution
 - Developing and evaluating sampling and site characterization approaches to identify sources and extent of contamination.
- **Impact:** Stakeholders will be able to assess potential PFAS sources and exposures, and identify key exposure pathways for risk management



Research: Human Health/Toxicity

- **Problem:** Lack of toxicity values for many PFAS compounds
- **Action:**
 - Literature review of published toxicity data for 31 PFAS of interest
 - Conduct assessments, fill gaps through computational toxicology
- **Results:**
 - Literature review complete, ~21 PFAS with some in vivo data to support assessment
 - Toxicity assessment underway for GenX, PFBS
 - Computational assays underway for 75 PFAS representative of PFAS chemical space
- **Impact:** Stakeholders will have PFAS toxicity values to support risk management decisions and risk communication



Research: Drinking Water Treatment

- **Problem:** Lack of water treatment technology performance and cost data for PFAS removal
- **Action:**
 - Review PFAS performance data from available sources (industry, DoD, academia, international)
 - Test commercially available granular activated carbons (GACs) and ion exchange (IE) resins for effectiveness over a range of PFAS under different water quality conditions
 - Evaluate a range of system sizes – large full-scale utility options to home treatment systems
- **Results:**
 - Update EPA's **Drinking Water Treatability Database**, a public database for treatment performance data for regulated and unregulated contaminants
 - Use state-of-the-science models to extrapolate existing treatment studies to other conditions
- **Impact:** Utilities will be able to identify cost effective treatment strategies for removing PFAS from drinking water



Research: Contaminated Site Remediation

- **Problem:** PFAS-contaminated sites require remediation and clean up to protect human health and the environment
- **Action:**
 - Characterize sources of PFAS such as fire training and emergency response sites, manufacturing facilities, production facilities, disposal sites
 - Evaluate treatment technologies for remediating PFAS-impacted soils, waters, and sediments
 - Generate performance and cost data with collaborators to develop models and provide tools to determine optimal treatment choices
- **Results:** Tools, data and guidance regarding cost, efficacy, and implementation for remedy selection and performance monitoring
- **Impact:** Responsible officials will know how to reduce risk of PFAS exposure and effects at contaminated sites, and to repurpose sites for beneficial use



Research: Materials Management

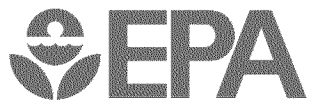
➤ **Problem:** Lack of knowledge regarding end-of-life management (e.g. landfills, incineration) of PFAS-containing consumer and industrial products

➤ **Action:**

- Characterize various end-of-life disposal streams (e.g. municipal, industrial, manufacturing, landfills, incinerators, recycled waste streams) contributing PFAS to the environment
- Evaluate efficacy of current and advanced waste management technologies (e.g. landfilling, thermal treatment, composting, stabilization) to manage PFAS at end-of-life disposal
- Evaluate performance and cost data with collaborators to manage these materials and manage PFAS releases to the environment

➤ **Results:** Provide technologies, data and tools to manage these end of use streams

➤ **Impact:** Responsible officials will be able to manage effectively end-of-life disposal of PFAS-containing products



Technical Assistance for States, Tribes and Communities

- **Problem:** State, tribes and communities sometimes lack full capabilities for managing PFAS risk
- **Action:**
 - Make EPA technical staff available to consult on PFAS issues
 - Utilize applied research at impacted sites to develop new research solutions while also providing technical support to site managers
 - Summarize reoccurring or common support requests to share lessons learned from technical support activities
- **Results:** Many examples of past and ongoing technical assistance
 - **Cape Fear River, NC** – Significant reductions in PFAS in source and finished drinking water
 - **Manchester, NH** – Collaboration on air and water sampling
 - **Newport, RI** – Review and support to DOD PFAS sampling at Naval Station Newport
- **Impact:** Enable states, tribes and communities to ‘take action on PFAS’



EPA PFAS Data and Tools

Links to data and tools that include information related to PFAS and are available on EPA's website:

<https://www.epa.gov/pfas/epa-pfas-data-and-tools>

EPA PFAS Data and Tools

Secure | <https://www.epa.gov/pfas/epa-pfas-data-and-tools>

Apps National Locator ORD PFAS Wiki 1601 valley creek, 2 Imported From IE Remote Access Solu U.S EPA Web Server Sign-In Notification LastPass

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PFOA, PFOS and Other PFASs

PFAS Home

Basic Information on PFAS

EPA Actions

PFAS Infographic

Data and Tools

State Information

EPA PFAS Data and Tools

Below are links to data and tools that include information on PFAS and are currently available on the agency's website.

Chemistry

- [Chemistry Dashboard](#)
- [ChemView](#)

Drinking Water

- [Drinking Water Treatability Database](#)
 - [PFQA](#)
 - [PFQS](#)
- [Drinking Water Laboratory Methods](#)
- [Data from EPA's Third Unregulated Contaminant Monitoring Rule \(UCMR\)](#)

Toxicity

- [GenX Chemicals Studies](#)
- [Health & Environmental Research Online \(HERO\)](#)
- [Toxics Release Inventory](#)

Waste

- [Sampling and Laboratory Methods \(SW-486 Compendium\)](#)

[Contact Us](#) to ask a question, provide feedback, or report a problem.